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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/698,926
Filing Date: October 31, 2003
Appellant(s): SILVERSTEIN, D. AMNON

James D. Shaurette
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed August 29, 2008 appealing from the Office action mailed November 11, 2007.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

4765564	Colvocoresses	8-1988
3942154	Akimi et al	3-1976

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 102

Claims 1-7, 9-11, 15, 16, and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by Colvocoresses (U.S. Pat. 4,765,564).

First, in regard to **claim 1**, the Colvocoresses reference teaches an imaging apparatus comprising an optical device (optic means) configured to receive light and to provide a plurality of color components (i.e. blue, green, and red color bands) of the received light, an image sensor including a plurality of color sensor arrays (detector arrays) arranged elevationally over one another and configured to receive respective ones of the color components (blue, green, and red), and the color sensor arrays individually comprising a plurality of sensors configured to provide image data for a plurality of pixels of a respective one of the color components at an initial resolution, wherein the plurality of color sensor arrays overlap and are offset with respect to one

another (as illustrated in Fig. 2b) to define a plurality of sub-pixels for individual ones of the pixels, and processing circuitry (computer program means) configured to access the image data for pixels from each of the plurality of color sensor arrays (blue, green, and red), and using the accessed image data, to determine sub-pixel image data for the respective sub-pixels to form an image of an increased resolution compared with the initial resolution of the color sensor arrays. Please refer to Figs. 2b, 3b, 5, and 7, and Col. 3, Line 4 – Col. 4, Line 42, and Col. 4, Line 55 – Col. 6, Line 32.

In regard to **claim 2**, the limitations of claim 1 are taught above, and the Colvocoresses reference further teaches that the arrays comprise a plurality of photodetectors at individual pixels to detect respective color components of light (i.e. blue, green, and red), as is taught in Figs. 2b and 3b, and Col. 3, Line 4 – Col. 4, Line 42.

As for **claim 3**, again the limitations of claim 1 are set forth above, and Colvocoresses teaches that each of the sub-pixels comprise red, green, and blue color components, and the plurality of color sensor arrays comprise red, green, and blue color sensor arrays, as is taught in Figs. 2b and 3b, and Col. 3, Line 4 – Col. 4, Line 42.

Considering **claim 4**, the limitations of claim 3 are taught above, and Colvocoresses teaches that overlapping of the red, green, and blue color sensor arrays (as shown in Fig. 3b) enables determination of the image data at an increased number of physical locations (i.e. nine sub-pixels are produced from each basic pixel) within the individual ones of the pixels to create an image of a higher resolution at a sub-pixel

level. See again Figs. 2b, 3b, 5, and 7, and Col. 3, Line 4 – Col. 4, Line 42, and Col. 4, Line 55 – Col. 6, Line 32.

Next, in regard to **claim 5**, the limitations of claim 1 are set forth above, and Colvocoresses teaches that the increased resolution image is created by determining sub-pixel image data for individual pixels using the image data from each of the plurality of color sensor arrays, as taught in Figs. 2b, 3b, 5, and 7, and Col. 3, Line 4 – Col. 4, Line 42, and Col. 4, Line 55 – Col. 6, Line 32.

Regarding **claim 6**, again the limitations of claim 1 are set forth above, and Colvocoresses also teaches that the offsetting of the color sensor arrays is performed by physically shifting the plurality of color sensor arrays in a desired direction, as is illustrated in Fig. 3b and taught in Col. 3, Line 4 – Col. 4, Line 42, and Col. 4, Line 55 – Col. 6, Line 32.

In regard to **claim 7**, the limitations of claim 1 are taught above, and Fig. 7 illustrates that the optical device is configured to output the color components in a direction which is the same as the direction of travel of the received light.

Considering **claim 9**, the limitations of claim 1 are set forth above, and Colvocoresses teaches that the color sensor arrays (shown in Figs. 2b and 3b) are configured in an offset arrangement with respect to on another and with respect to a direction of travel of the received light. See again Col. 3, Line 4 – Col. 4, Line 42, and Col. 4, Line 55 – Col. 6, Line 32.

Next, regarding **claim 10**, Colvocoresses discloses an imaging apparatus comprising an image sensing means implemented as a single device (i.e. a single image sensor comprising a plurality of detector arrays) and including a plurality of color sensor arrays (arrays for red, green, and blue, as shown in Fig. 2b), individual sensor arrays comprising a plurality of sensor means for providing image data for a plurality of pixels of a respective color component at an initial resolution, wherein individual ones of the sensor arrays are arranged elevationally over one another in a layered stack (as shown in Fig. 3b) of the image sensing means for individually detecting red, green, and blue components of light, respectively, wherein the plurality of sensor means of respective color sensor arrays are arranged in an offset relationship with respect to one another in the single device (again shown in Fig. 3b) for defining a plurality of sub-pixels of individual ones of the pixels, and processing means (computer program means) for accessing the image data for at least one pixel from each of the plurality of color sensor arrays, and using the accessed image data to form an image of an increased resolution compared with the initial resolution of the color sensor arrays. Please refer to Figs. 2b, 3b, 5, and 7, and Col. 3, Line 4 – Col. 4, Line 42, and Col. 4, Line 55 – Col. 6, Line 32.

As for **claim 11**, the limitations of claim 10 are taught above, and Colvocoresses also teaches that the offset is achieved by a shift of layers of the sensor means (illustrated in Fig. 3b) in the image sensing means. Please refer again to Col. 3, Line 4 – Col. 4, Line 42, and Col. 4, Line 55 – Col. 6, Line 32.

Considering **claim 15**, the limitations of claim 10 are set forth above, and the Colvocoresses reference discloses that the sensor means are offset in a depthwise

direction with respect to the direction of received light, as illustrated in Fig. 2b and taught in Col. 3, Line 4 – Col. 4, Line 42.

Regarding **claim 16**, again the limitations of claim 10 are taught above, and Colvocoresses further teaches that the processing means comprises means for determining the sub-pixel image data for the respective sub-pixels of an individual pixel using the accessed image data of the respective individual pixel, and the processing means further comprises means for forming an image of the increased resolution. Please refer to Col. 4, Line 55 – Col. 6, Line 32.

Finally, considering **claim 27**, the Colvocoresses reference discloses an article of manufacture comprising a processor-usable medium (computer program means) comprising processor-usable code configured to cause processing circuitry to perform processing comprising accessing image data for at least one pixel from each of a plurality of color sensor arrays (red, green, and blue array) at an initial resolution, and forming an image of increased resolution, compared with the initial resolution of individual ones of the color sensor arrays, using the accessed image data, wherein the color sensor arrays are offset with respect to one another providing a plurality of image data values for at least one color component for a single pixel location and wherein a sum of the image data values comprising intensity values for a single color component for the single pixel location are equal to an intensity value of the accessed image data for the single color component for the single pixel location. Please refer to Figs. 2b, 3b, 5, and 7, and Col. 3, Line 4 – Col. 4, Line 42, and Col. 4, Line 55 – Col. 6, Line 32.

Claim Rejections - 35 USC § 103

Claims 8 and 17-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Colvocoresses (U.S. Pat. 4,765,564) in view of Akami et al. (U.S. Pat. 3,942,154).

Regarding **claim 8**, the limitations of claim 1 are taught above, and while Colvocoresses does teach an optical device in Fig. 7 wherein the different bands of light are emitted separately (as shown in Fig. 2b), the Colvocoresses reference fails to specifically teach that the optical device is a prism. However, noting the Akami reference, Akami teaches an imaging apparatus wherein the optical device to separate the different color bands is a prism (15), as is taught in Fig. 3 and Col. 3, Lines 42-58. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the prism of Akami with the optical system of Colvocoresses, as the splitting of different color bands using a prism enables each sensor array to correspond to wavelengths of individual colors (as taught by Akami in Col. 3, Lines 54-58), as opposed to solely relying on color filters on each sensor array to filter out specific colors.

Next, considering **claim 17**, the Colvocoresses reference teaches an image data processing method comprising providing image data using an image sensor, the providing comprising receiving light traveling in a direction using an optical device (shown in Fig. 7), receiving light components using a plurality of color sensor arrays of the image sensor, wherein the color sensor arrays have an initial resolution, generating image data using the color sensor arrays, accessing the image data from each of the plurality of color sensor arrays, and forming an image having an increased resolution

compared with the initial resolution of the color sensor arrays using the accessed image data (See Figs. 2b, 3b, 5, and 7, and Col. 3, Line 4 – Col. 4, Line 42, and Col. 4, Line 55 – Col. 6, Line 32). What Colvocoresses fails to specifically teach is that using the optical device, providing the light into a plurality of light components corresponding to different wavelengths of light and outputting individual ones of the light components in the same direction of travel of the received light. However, noting the Akami reference, Akami teaches a optical device to separate the different color bands via a prism (15), as is taught in Fig. 3 and Col. 3, Lines 42-58. The light components are output in the same direction of travel of the received light, as is again shown in Fig. 3. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the prism that divides the plurality of light components, as taught by Akami, with the optical system of Colvocoresses, as the splitting of different color bands using a prism enables each sensor array to correspond to wavelengths of individual colors (as taught by Akami in Col. 3, Lines 54-58), as opposed to solely relying on color filters on each sensor array to filter out specific colors.

Considering **claim 18**, the limitations of claim 17 are taught above, and Colvocoresses further discloses that the forming comprises determining sub-pixel image data from the accessed image data, and using the sub-pixel image data to form the image having increased resolution. See Col. 4, Line 55 – Col. 6, Line 32.

In regard to **claim 19**, again the limitations of claim 17 are taught above, and Colvocoresses teaches that the image having increased resolution is formed at a sub-pixel level, as is again shown in Col. 4, Line 55 – Col. 6, Line 32.

Regarding **claim 20**, the limitations of claim 17 are taught above, and Colvocoresses teaches that the color sensor arrays overlap and are offset with respect to one another in the direction of travel of the received light, as is taught in Figs. 2b and 3b, as well as in Col. 3, Line 4 – Col. 4, Line 42, and Col. 4, Line 55 – Col. 6, Line 32.

Considering **claim 21**, the limitations of claim 17 are set forth above, and Akami teaches that the optical device is a prism (15), as is taught in Fig. 3 and Col. 3, Lines 42-58.

Finally, regarding **claim 22**, again the limitations of claim 17 are taught above, and Akami also teaches that the optical device is a lens in Fig. 3 and Col. 3, Lines 42-58.

(10) Response to Argument

A. Claims 1-7 and 9 are properly rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 4,765,564 to Colvocoresses.

Appellant asserts that Colvocoresses fails to teach "an optical device configured to receive light and to provide a plurality of color components of the received light" (Appeal Brief, p. 3). The Examiner respectfully disagrees.

Appellant supports this assertion by first stating that "Appellants have electronically searched an entirety of the Colvocoresses reference and failed to uncover any reference to an optic means in the text of Colvocoresses" (Appeal Brief, p. 4). The Examiner, after conducting an electronic search of the reference via one of the primary electronic databases employed during patentability searches by the U.S. Patent and

Trademark Office, agrees with the Appellant. Colvocoresses does not provide any reference to the term “optic means” within the electronically searchable body of text. However, during the initial review of the reference, as well as after a subsequent, personal reading of the reference, the Examiner finds the Colvocoresses reference to not only provide a teaching of "optics" within figure 1, but also to provide for and clearly recite "optic means" within figure 7, and again within figure 8. Therefore, the Examiner submits that “optic means" are expressly provided within the Colvocoresses reference.

Appellant further attempts to support the above-assertion by stating that the figures of Colvocoresses fail teach or suggest the claimed optical device “configured to receive light and to provide a plurality of color components of the received light” (Appeal Brief, p. 4). The Examiner acknowledges that Colvocoresses does not expressly recite, *verbatim*, “an optical device configured to receive light and to provide a plurality of color components of the-received light”. Nonetheless, the Examiner does not concede that the reference does not teach the above-recited limitation. In fact, when considered using the perspective of one of ordinary skill in the art, Colvocoresses is found to clearly teach “an optical device configured to receive light and to provide a plurality of color components of the-received light”.

To begin, Colvocoresses is found to provide an optical device by providing "optic means" within both figures 7 and 8 (as well as “optics” within figure 1). Further, Colvocoresses provides that the optic means are configured to both receive light and provide light; the light provided being a plurality of color components. Specifically, Colvocoresses teaches that, in order to form an image using the typical, *conventional*

equipment (used in both the prior art and in combination with the novel offset detector elements instant invention – col. 2, lines 37-52), the optic means focus electromagnetic energy *from* an object/scene *onto* the detector elements (figs. 1, 7 and 8; col. 1, lines 6-10; col. 2, lines 1-2). Colvocoresses also requires that the detectors receiving the focused electromagnetic energy, receive at least two different wavelengths of electromagnetic energy (e.g., blue, green, and red – col. 3, lines 4-15; claims 2-4; figures 1, 7, and 8). In light of the above, using the perspective of one of ordinary skill in the art, Colvocoresses is found to clearly provide "optic means" (optical device) which takes electromagnetic energy (receives light) and focuses at least two different wavelengths of this energy onto the detectors (provides a plurality of color components of the-received light). Therefore, because Colvocoresses teaches an "optical device configured to receive light and to provide a plurality of color components of the received light", the Examiner maintains that claims 1-7 and 9 are anticipated by Colvocoresses

Claim 8, by virtue of its dependence from independent claim 1, also contain the above-recited limitation. Therefore, for at least the same reasons as stated above, the Examiner maintains that claim 8 is anticipated by way of Colvocoresses.

B. Claims 10, 11, 15 and 16 are properly rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 4,765,564 to Colvocoresses.

Appellant first asserts that Colvocoresses fails to teach an image sensing means implemented as a single device and comprising plural color sensor arrays as specifically claimed in combination with the other limitations regarding the image sensing means of

claim 10 (Appeal Brief, p. 5). In support of this assertion, Appellant states that "Appellants have failed to uncover any teachings" by Colvocoresses of "an image sensing means implemented as a single device" (Appeal Brief, pp.5-6). The Examiner respectfully disagrees.

Claim 10, as currently presented, includes "an image sensing means implemented as a single device, and including: a plurality of color sensor arrays, individual sensor arrays comprising a plurality of sensor means for providing image data for a plurality of pixels of a respective color component at an initial resolution;..."

Comparably, Colvocoresses teaches "an image sensing means", by teaching multiple offset arrays responsive to different wavelengths used to create a number of sub-pixels in each picture element (figs. 2(b) and 3(b); col. 3, lines 4-46; col. 3, lines 17-22). Further, Colvocoresses teaches that the multiple offset arrays (image sensing means) require employment/implementation, in concert, in an overlap fashion, to create the resultant multiple response differences (col. 4, lines 37-39; col. 5, line 20 - col. 6, line 17; fig. 6), i.e., image sensing means implemented as a single device.

This teaching by Colvocoresses is interpreted to correspond with *image sensing means* (multiple offset arrays) implemented as a single device (multiple offset arrays employed /implemented, in concert, in an overlap fashion), *and including: a plurality of color sensor arrays* (multiple detector arrays of different wavelengths), *individual sensor arrays comprising a plurality of sensor means for providing image data for a plurality of pixels of a respective color component at an initial resolution* (individual detector arrays, each of different wavelengths provide image data via a plurality of detectors/pixels of

the respective wave length (green, red, or blue), and wherein any data received at any resolution would inherently be captured at an initial resolution) (figs. 2(b), 3(b), and 6; col. 3, lines 4-46; col. 3, lines 17-22; col. 4, lines 37-39; col. 5, line 20 - col. 6, line 17).

Based on the foregoing, and because the PTO must give words their broadest reasonable meaning in their ordinary usage, as understood by one of ordinary skill in the art (In re Morris, 127 F.3d 1048, 44 USPQ2d 1023 (Fed. Cir. 1997)), the Examiner maintains that Colvocoresses teaches an image sensing means implemented as a single device and comprising plural color sensor arrays as specifically claimed, and in combination with the other limitations regarding the image sensing means of claim 10.

Claims 11, 15, and 16, by virtue of their dependence from independent claim 11, also contain the above-recited limitation. Therefore, for at least the same reasons as stated above, the Examiner maintains that claims 11, 15, and 16 are also anticipated by way of Colvocoresses.

C. Claim 27 is properly rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 4,765,564 to Colvocoresses.

Appellant asserts that Colvocoresses fails to teach "that a sum of the image data values comprising intensity values for a single color component for the single pixel location are equal to an intensity value of the accessed image data for the single color component for the single pixel location" (Appeal Brief, pp. 6-7). In support of this assertion, Appellant states that "Appellants have failed to locate any teachings in Colvocoresses that a plurality image data values comprising intensity values for a color

component for a single pixel location when summed are equal to the intensity value of the accessed image data for the single color component for the single pixel location" (Appeal Brief, p. 7). The Examiner respectfully disagrees.

This limitation is interpreted by the Examiner in the following manner, first, a sum of color intensity *values* at one pixel location ("a sum of the image data values comprising intensity values for a single color component for the single pixel location") equals the color intensity *value* for that location ("equal to an intensity value of the accessed image data for the single color component for the single pixel location"), or more simply, the stored/accessed intensity value of a pixel = the total of a sub-pixel intensity values originally generated. Support for this interpretation can be found in reference to Appellant's specification, which states, "a sum of intensities of the sub-pixels is equal to an intensity of the individual respective pixel having such sub-pixels" (¶0040).

Correspondingly, Colvocoresses teaches, for example, with three wave bands, 9 sub-pixels are produced from each basic pixel, thus increasing the amount of data to be processed nine fold (col. 4, lines 37-39; also see fig. 5 and col. 6, lines 5-10). In other words, the data employed by Colvocoresses to represent one pixel is based on data generated by its sub-pixels, which is also to say, the sum of its sub-values equals the value of the image data for that pixel. Therefore, based on the foregoing, and because the PTO must give words their broadest reasonable meaning in their ordinary usage, as understood by one of ordinary skill in the art (In re Morris, 127 F.3d 1048, 44 USPQ2d

1023 (Fed. Cir. 1997)), the Examiner maintains that Colvocoresses teaches above-recited limitations regarding the article of manufacture of claim 27.

The Appellant also asserts that, by way of additional electronic reviews of the reference, Appellants have failed to uncover any reference therein to “intensity” or “summing” (Appeal Brief, p. 7). Once again, in response to an electronic search of the exact and specific terms of “summing” and “intensity”, the Examiner agrees with the Appellant regarding the lack of explicit existence of those exact terms within the reference. Nevertheless, the Colvocoresses reference does provide for addition of the sub-pixels, i.e., a summing, to generate pixel data (col. 4, line 56 – col. 6, line 10), as well as teach that, for example, data from 9 sub-pixels can be produced from a basic pixel (col. 4, lines 37-39), wherein the result produced is interpreted to be equal to “summing”, i.e., the sum of the parts equal the whole. The Examiner notes that although the specification employs a distinct form of mathematical summation, the current claim language only calls for "summing", which is broadly interpreted to be equated to the result of addition. The PTO must give words their broadest reasonable meaning in their ordinary usage, as understood by one of ordinary skill in the art (In re Morris, 127 F.3d 1048, 44 USPQ2d 1023 (Fed. Cir. 1997)). Therefore, the Examiner maintains that Colvocoresses teaches above-recited limitations regarding the article of manufacture of claim 27.

Regarding the term “intensity”, in the determination of pixel values, the Colvocoresses reference is found to sum “radiance” values (col. 5, lines 9-10). One of ordinary skill in the art of image sensors would clearly understands that the term

"intensity" is and can be used interchangeably with the term "radiance", in that the measurement value produced by a given pixel (generally a voltage) is merely a representative value of the amount of light impinging on that pixel, regardless of the term applied to that value. Therefore, based on the general understandings of one of ordinary skill in the art, in which the term "radiance" can be synonymously interpreted in place of the term "intensity" to label a measured amount of light, and in light of the teachings of the Colvocoresses reference summing "radiance" values, the Examiner maintains that Colvocoresses teaches above-recited limitations regarding the article of manufacture of claim 27.

D. Claims 17-22 are properly rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,765,564 to Colvocoresses in view of U.S. Patent No. 3,942,154 to Akami et al.

Appellant asserts that the positively-recited limitations of the claims are neither disclosed nor suggested by the prior art even if the teachings of the references are combined and the 103 rejection is improper for at least this reason. (Appeal Brief, p.8). The Examiner respectfully disagrees.

Appellant supports this assertion by stating "Colvocoresses is void of disclosing the limitations *of providing light into a plurality of light components corresponding to different wavelengths of light using an optical device*. Furthermore, Appellants have failed to uncover any teachings in U.S. Patent No. 3,942,154 to Akami (hereinafter "Akami') of *receiving light components using a plurality of color sensor arrays*" (Appeal

Brief, p.8). In the above assertion, Appellant argues the Colvocoresses does not teach a first limitation (providing light components), and that Akami does not teach a second limitation (receiving light components). Again, the Examiner agrees with the Appellant. Colvocoresses does not teach the first limitation (providing light components), a fact which was expressly disclosed by the Examiner of record in the rejection of claim 17 supra, and which, in light of this deficiency, resulted in the introduction of the Akami reference. Further to this, because the primary reference, Colvocoresses, was found to teach the second limitation (receiving light components), the Akami reference was neither needed for such a teaching, nor employed for such a teaching.

More specifically, Colvocoresses is found to teach all of the limitations of method claim 17, except "using the optical device, providing the light into a plurality of light components corresponding to different wavelengths of the light and outputting individual ones of the light components in the same direction of travel of the received light" (rejection of claim 17, supra). In light of this deficiency, the Akami reference is employed for the teaching of an optical device to separate the different color bands via a prism (fig. 3, element 15; col. 3, lines 49-58), in which the light components are output in the same direction of travel as the received light (fig. 3, in a direction away from element 12 and towards elements 16 and 17). It would have been obvious to one of ordinary skill in the art at the time of the invention to have incorporated the prism that divides the plurality of light components, as taught by Akami, with the optical system of Colvocoresses, as the splitting of different color bands using a prism enables each sensor array to correspond to wavelengths of individual colors (as taught by Akami in

Col. 3, Lines 54-58), as opposed to solely relying on color filters on each sensor array to filter out specific colors (rejection of claim 17, supra).

In essence, it is the Examiner's position that anyone possessing the general knowledge of one of ordinary skill in the art at the time of the invention would have understood that separating light waves via a prism into individual wavelengths representing individual colors as taught by Akami, and therefore providing on an individual basis, the different waves of light (blue, green, and red) received by the pixels as taught by Colvocoresses, would have resulted in a structure that was no longer solely reliant on color filtering properties of the detector arrays to separate the different waves of light (blue, green, and red), because receiving light specific to an particular array is an obvious advantage to its functionality, as it prevents the pixel from generating false responses caused by other closely related wavelengths that may affect the pixel if received (as no sensor is inherently perfect in limiting the specific range of wavelengths affecting its response, the greater the filtering into specific ranges, the more representative the response).

Appellant attempts to refute this obvious advantage by stating "Appellants have failed to uncover any teachings in Colvocoresses that Colvocoresses is directed towards or concerned with providing different light components of source light by filtering or otherwise. Appellants have electronically searched Colvocoresses and failed to uncover any teachings in Colvocoresses regarding filtering or providing different light components corresponding to different wavelengths of light" (Appeal Brief, p.8).

However, as Colvocoresses directly relates to the functionality of multiple imaging arrays, each responsive to a different waveband of light (a filtering function specific to each array), Colvocoresses would be found to benefit from the advantages of the prism taught by Akami, in that the light allowed to reach the different arrays would be filtered /pre-filtered into separate wavebands, thus requiring less stringent filtering functions by the various arrays designed to capture different ranges of frequencies of light; an advantage that would have been obvious to a person possessing the general knowledge associated with one of ordinary skill in the art at the time of the invention. MPEP§2144 provides that "[t]he strongest rationale for combining references is a recognition, expressly or impliedly in the prior art or drawn from a convincing line of reasoning based on established scientific principles or legal precedent, that some advantage or expected beneficial result would have been produced by their combination. In re Sernaker, 702 F.2d 989, 994-95, 217 USPQ 1, 5-6 (Fed. Cir. 1983). >See also Dystar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick, 464 F.3d 1356, 1368, 80 USPQ2d 1641, 1651 (Fed. Cir. 2006) ("Indeed, we have repeatedly held that an implicit motivation to combine exists not only when a suggestion may be gleaned from the prior art as a whole, but when the improvement is technology-independent and the combination of references results in a product or process that is more desirable, for example because it is stronger, cheaper, cleaner, faster, lighter, smaller, more durable, or more efficient. Because the desire to enhance commercial opportunities by improving a product or process is universal—and even common-sensical—we have held that there exists in these situations a motivation to combine

prior art references even absent any hint of suggestion in the references themselves.")" (Emphasis added).

Based on the foregoing, the Examiner maintains that claim 17, and all claims dependent therefrom, are properly rejected under 35 U.S.C. 103(a) as being anticipated by Colvocoresses in view of Akami et al.

E. Claim 11 is properly rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 4,765,564 to Colvocoresses.

Appellant asserts Colvocoresses fails to teach that the "offset is achieved by a shift of layers of the sensor means in the image sensing means which is implemented as a single device" (Appeal Brief, p. 10). The Examiner respectfully disagrees.

Claim 11 recites "The imaging apparatus of claim 10, wherein the offset is achieved by a shift of layers of the sensor means in the image sensing means."

Because Colvocoresses teaches that the "imaging apparatus or sensor" (i.e., "single device") of figure 3(b) is required to have the detector arrays offset in two directions in order to create the necessary sub-pixels of the invention (col. 3, lines 28-35), the reference is submitted as providing a clear and explicit teaching of the above-recited limitation.

Based on the foregoing, the Examiner maintains that claim 11 is properly rejected under 35 U.S.C. 102(b) as being anticipated by Colvocoresses.

F. Claim 22 is properly rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,765,564 to Colvocoresses in view of U.S. Patent No. 3,942,154 to Akami et al.

Applicant asserts that the limitations of claim 22 are not disclosed by the prior art (Appeal Brief, p. 11). More specifically, Appellant states that they have failed to uncover any teaching of "using the optical device comprising a lens, providing light into a plurality of light components corresponding to different wavelengths of the light" (Appeal Brief, p. 11). The Examiner respectfully disagrees.

Claim 22 recites "The method of claim 17, wherein the optical device is a lens."

After an extensive electronic search, followed by an actual reading of Appellant's specification, neither definition, guidance, nor teachings regarding the construction, composition, or definition of the lens as an "optical device" were uncovered beside that provided in claim 22, and similarly worded original claims 9 and 14; particular emphasis was placed on wherein "the optical device comprises a lens in combination with claim 17 reciting using the optical device, providing light into a plurality of light components corresponding to different wavelengths of the light" as affirmatively asserted by the Appellant (Appeal Brief, p. 10). However, some guidance was provided by Appellant via the SUMMARY OF THE CLAIMED SUBJECT MATTER, which states "Referring to dependent claim 22, an optical device is described at page 9, line 1 of the specification and shown in Fig. 4B according to one embodiment" (Appeal Brief, p. 2). Page 9, lines 1-2 of the specification states "the offset may be implemented using an optical device,

such as, for example, a prism 404, …", and figure 4B illustrates prism 404, as shown:

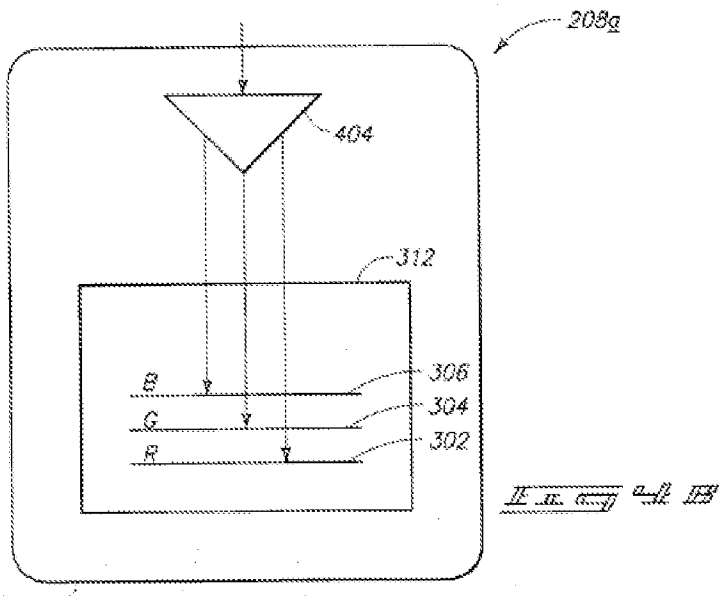

Figure 3 of Akami teaches light passing through a prism acting as a spectral apparatus (element 15), after which the light, now divided into several spectral regions, is converted into corresponding electric signals by the photoelectric converter (element 17) (col. 3, lines 42-58).

In light of a definition or teaching by Appellant to the contrary, and given that both the Appellant and the Akami reference employ a prism as "a lens", the prism acting as a spectral apparatus (element 15) as taught by Akami is interpreted to be the lens/optical device used in "providing light into a plurality of light components corresponding to different wavelengths of the light" of the method claim as currently presented.

Based on the foregoing, and in combination with the previously presented teaching of Colvocoresses, the Examiner maintains that claim 22 is properly rejected under 35 U.S.C. 103(a) as being unpatentable over Colvocoresses in view of Akami.

G. Conclusion

In spite of Appellant's "electronic searches" and continued "failure to uncover any teaching" of the applied references, the Examiner submits that the Colvocoresses reference, as well as the Colvocoresses reference in view of Akami, teach or disclose all of the positively-recited limitations of each of the claims as presented above. Accordingly, the Examiner respectfully requests that the Board sustain all rejections.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Gary C. Vieaux/

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